

entertain a more lively respect for them, in short, to give them a greater measure of financial support, biologists would very shortly eradicate house-flies, idiot children, bean-weevils and bed-bugs; make it possible for anxious parents to have a family of twelve girls at will and keep the working classes alive exclusively on tinned food."

Before science can occupy its proper place in cultural education, it is pointed out that the way in which science is taught must be modified. "A biologist should not be prevented from studying physical chemistry to an advanced stage because he has neither time nor inclination to devote to a tedious routine of analysis devised for those who are going to take positions in dye-works. A physicist should be permitted to know something about the nature of biological inquiry without wasting half a year cutting hand-razor sections of stems and learning the names of pressed flowers, fish-bones and beetles." The importance of a historical presentation is emphasized.

The last essay deals with holism, and it is emphatically argued that holism is not useful from the point of view of further scientific advance.

It has been necessary to consider rather in detail a single essay in reviewing this book, and much that could otherwise have been discussed has therefore to be omitted. The book is a most admirable presentation of a clear-cut point of view. It is difficult to recall any volume dealing with these rather complex subjects which is so simply and lucidly written. It has the merit of being very direct. Whether or not one agrees in detail with all that is said, the issue is presented sharply and clearly, without circumlocution or endless and irritating qualification. The experimental biologist is usually far more ready to criticize the general or philosophical work of another than to express his own opinions, and this is probably particularly true of those who take the mechanistic view. Professor Hogben has undoubtedly performed a notable service, and it is to be hoped that his book will be very widely read.

The only real criticism one has to make is that there is no index, a most remarkable and irritating omission.

J. A. FRASER ROBERTS.

THE BRAIN'S ASCENT

Tilney, Frederick, Ph.D., M.D. *The Brain from Ape to Man*. London, 1928. H. K. Lewis. Two volumes. Pp. xxvii+xv+1,120. 557 illustrations, many in colour. Price £5 5s.

DR. Frederick Tilney is a world-wide authority on the nervous system, a subject to which he has devoted his life, and this work is a monument to, and of, his painstaking industry. This work is so vast that it cannot have the luxury of many readers—rare at any time when the intricacies of the nervous system are involved—of the cover-to-cover variety. But Tilney's book is an indispensable work—almost a library in itself—of reference, and ought to find a place on the shelves of every medical library and pathological or psychiatric laboratory.

The first three parts of this work are devoted to the careful study of the structure of the nervous systems of the lower, intermediate, and higher anthropoids. Of the lower primates, Dr. Tilney has examined, amongst others, the lemur, tarsius spectrum, the marmoset, and the red howling monkey. The intermediate primates are here represented by the common dog-headed baboon, the macaques, and the gibbon, and the higher primates by the orang-outang, the chimpanzee, and the gorilla. Of these the chimpanzee is, by reason of its greater educability, easily the most interesting. In all these primate forms the procedure has been uniformly the same—a fact which adds to the value of the observations. There is given an account of the general appearance, habits, and life of the animal; a description of the brain with its fissures and lobes, and of the brain stem. There is a written and illustrated description of the chief microscopic appearances of

sections cut at standard levels through the brain stem, together with reconstructions from these sections. Of the 1,120 pages of this book, 730 are devoted to the primates.

The fourth part of the book is devoted to "Man." The first chapter in this section, entitled "From Primitive to Modern Man," clearly reflects much less of Dr. Tilney's original observations and much more of a compilation from the work of others. It is thus not so satisfying as the earlier parts of the work. Next follows an account of the brain of modern man dealt with on the same lines as those of the primates. Quite frankly, we do not much care for this section, and we could easily mention half a dozen modern works which give a better account of the actual naked-eye or gross structural details of the neo-pallium and brain stem. This naked-eye study of the nervous system has been done to death and is nowadays of trivial importance compared to the vast significance of the minute structure of the brain and spinal cord in general and the cortex in particular; and of all this there is no mention in Tilney's work, which leaves quite untouched the important problem of the relationship between brain and mind—which is to-day the only thing that matters.

Tilney's next chapter deals with the brains of prehistoric men, and here again it is obvious that it is a compilation—a useful one, but still a compilation—of existing knowledge, rather than a new contribution thereto. There is, however, on pages 864-7, a list of 67 remains of prehistoric man, including the chief 'finds' from the Paviland Cro-Magnon skull of 1823 to the Galilee one of 1926.

The fifth and last part of this book concerns itself with the evolutionary modifications of the primate cerebrum, culminating in the human brain, and Tilney sets out to answer four self-propounded but interesting questions. To the present-day psychologist the second of these is the most significant, "Do the structural patterns of the brain in these primates manifest progressive modifications in harmony with progressive adaptations in the behaviour of

these animals?" And the answer is that the evidence "points conclusively to an evolutionary process which has run parallel with corresponding expansions in behavioural development."

And lastly and in conclusion, Tilney's observations and studies lead him to a conundrum which occupies the minds of all brain investigators, "Is there still a latent power in the human brain for the expression of yet unsuspected potentialities and beneficial progress?" Tilney does not venture to answer the conundrum, but if we are to believe the evidence of comparative anatomy and the evolutionary history of the brain of man with its nine to fourteen million neurons, from the simple nervous head ganglion of the common earthworm, there seems to be no reason whatsoever why, in the course of succeeding geological ages and the evolution of other and newer animal forms, the brain of man should not develop into a mightier implement than it is even at present. This, of course, always provided those present-day enemies to real human progress—the salaried politicians—do not finally extinguish human civilization, or throw us back into the melting-pot of palaeolithic man, when the consequent struggle for existence will result in the devil taking care of the hindmost. At all events no one can study the diencephalic brain of the reptiles of the geological Reptilian Age and compare it with the succeeding changes resulting in the evolution of a brand new brain—the neo-pallial cortex of the mammals—without realizing that what nature has once done, that may she do again.

But we may again repeat that what we are concerned with to-day is not the possibilities of the future, but the grim problems of the present, and one of these problems is undoubtedly the relationship of mind to matter, and that can never be solved by purely naked-eye studies of the brains of either animals or man. It is to the unit of brain structure—the neuron—that we must now and always look, and this aspect is untouched in the monumental work now before us. That, however, in no

way detracts from the utility of Tilney's work, which we cordially commend to those interested in the phases of evolutionary brain structure from "Ape to Man."

R. J. A. BERRY.

EUGENICS

Lenz, Dr. Fritz. *Menschliche Auslese und Rassenhygiene (Eugenik)*. 3rd edition. Munich, 1931. J. F. Lehmann. Pp. 593. Price, Rm. 17 and 15.

THIS is the second volume of the third edition of the well-known work by Baur, Fischer, and Lenz, the first volume of which appeared in 1927. It has been largely re-written, the chapters on the inheritance of the effects of alcohol and on sex derangements being omitted, while other portions of the work have been much extended.

The first section is devoted to selection in man, treated biologically and socially. The form taken by selection in the modern world is considered, and its effect on the fitness of the different organ systems of the body. The selective effects of acute infections, tuberculosis, venereal diseases, alcohol, and war are discussed at some length, as well as the selective effect of the infant death rate.

It is pointed out that among primitive peoples more than half the children die as nurslings, while the present rate in Germany is about 10 per cent. The death rate is highest in the first year, and the intensity of selection is not necessarily proportional to it, the amount of selection depending on the distribution of hereditary weaknesses and on the kind of influences exerted by the environment. The author's viewpoint is that inherited racial instincts are not adapted to modern conditions, since they were developed in a totally different environment. Therefore, without special precautions, many of the finest and best will be excluded from reproduction. Within this formula the fate of races is determined.

An analysis of the birth rates for differ-

ent classes in various countries shows with great regularity that the higher the social position, and hence in general the intellectual gifts, the lower is the birth rate, the more highly endowed classes failing to reproduce themselves. The causes of this decline in birth rate are discussed at length.

An interesting section of twenty-five pages is devoted to the future of races and peoples in different parts of the world. In European countries, the birth rate in 1927 ranged from 16.1 in Sweden and 19.8 in Denmark, to 23.1 in Holland, 37 in Bulgaria, and 44.2 in Russia. England came next to Sweden, with 16.7, while the rate of Germany was 18.3, and of France 18.2. The Nordic countries in general show a far lower birth rate, with steady increases towards the south (Italy 27.6) and the east, inhabited by Mediterranean, Slavic, and other peoples. The future of the Negro, Mongolians, and other races, is also discussed, with references to the works of Malthus and Gobineau, as well as recent writers.

The second half of the work is entitled *Practical Race Hygiene*, and the author points out that a social hygiene which is not also fundamentally race hygiene can have no permanent effect. In this connection such subjects as the marriage conditions in various countries and the prevention of propagation by defectives are discussed. The author concludes that sterilization of defectives would provide future space for many millions of normals, and he quotes Heinrich Poll to the effect that 10 per cent. of those with superior hereditary equipment should have not less than six children.

Questions of emigration and immigration are dwelt upon at some length in their racial and eugenic aspects, such political matters as capitalism, socialism, and fascism also receiving attention, while in another section important educational questions are considered in their eugenical bearing. Regarding the effects of the War, it is concluded that its devastation of the fitness of races was no less than a decade of modern western civilization.

The work surveys in a generally unbiassed and often illuminating way the many modern